

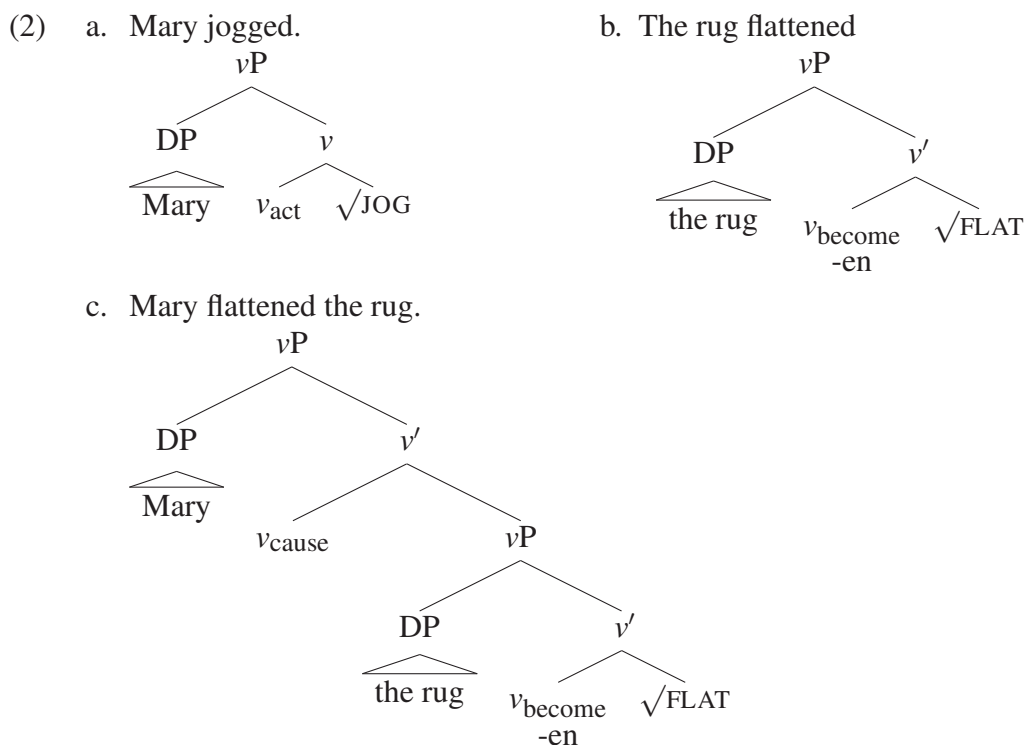
A Theory of the Roots of Verbal Meaning: Some Concepts and Consequences

1 Event structures as a theory of verb meaning

- An observation dating back to at least Lakoff (1965) is that verbal meanings are often roughly (paraphrasable by analytic constructions that make plain certain basic subcomponents of how the events they describe unfold, with commonalities across classes albeit with differing roots:

- (1) a. Mary flattened the rug. \approx Mary caused the rug to become flat.
- b. The rug flattened. \approx The rug became flat.
- c. Mary jogged/ran \approx Mary did jogging/running actions.

- This justifies an event structural approach to verb meaning. One variant treats these paraphrases as “real” in some sense, with event structures being underlying syntactic objects (McCawley 1968, 1971; Marantz 1997; Travis 2000; Harley 2003; Folli and Ramchand 2002; Folli and Harley 2004; Ramchand 2008; Alexiadou et al. 2015; *inter alia*).



- Various facts fall out. For example, what’s the top argument follows from the order of heads, shared aspectual morphology (e.g. $-en$) comes *vs*, shared morphology from shared roots, etc.
- A major question is how the event structure constrains the meaning of the verb — what are the truth conditional contributions of the various components, and how are they composed?
- I won’t go over the compositional details here, but essentially adding each layer just adds in extra information about what kind of event is described, possibly with a new argument.

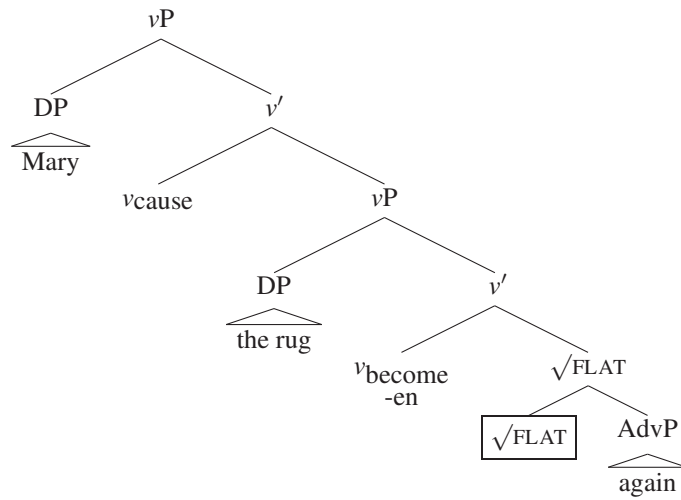
- (3) a. $[\sqrt{\text{FLAT}}] = \lambda x \lambda s [\text{flat}'(x, s)]$
 “A state of flatness s holds of y .”
 b. $[\nu_{\text{become}}] = \lambda P \lambda x \lambda e \exists s [\text{become}'(s, e) \wedge P(x, s)]$
 “Event e gives rise to a state s of type P for individual x .”
 c. $[\nu_{\text{cause}}] = \lambda Q \lambda y \lambda v \exists e [\text{effector}'(y, v) \wedge \text{cause}'(v, e) \wedge Q(e)]$
 “Event v with y as its effector causes an event e of type Q .”

- This analysis makes two key predictions. First, the causative should entail the corresponding inchoative. Second, sublexical modification arises as an attachment ambiguity (1996: 95).

(4) Mary flattened the rug again

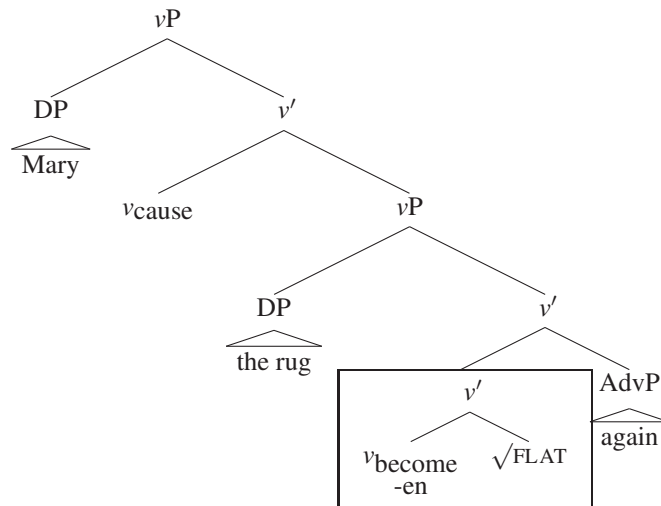
a. ... and it had been flat before.

(restitutive)



b. ... and it had flattened before.

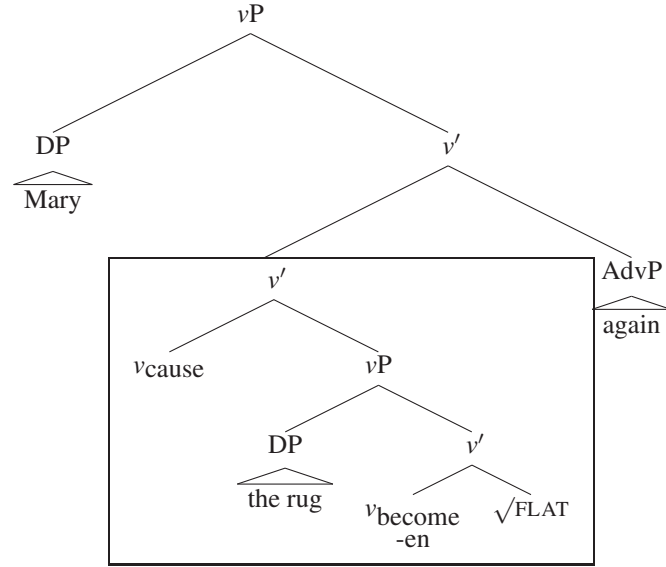
(repetitive)



c. ... and Mary had flattened it before.

(repetitive)

d.



- This theory also predicts that the root will define an unanalyzable scopal unit. Thus *Mary flattened the rug again* on the lowest scope of *again* means the rug again meets all the truth conditions that go with flatness. There is no further decomposition of the root's meaning.
- Now, a key point: the root vs. template distinction *is not* about syntactic event structures.
- For Rappaport Hovav and Levin (1998: 108) (rooted in Dowty 1979: 71-129), event structures are semantic representations associated built of basic non-logical constant primitives such as ACT, BECOME, and CAUSE defining action, becoming, and causing, respectively.

- (5) a. *jog*, [*y* ACT_{<jogging>}]
 b. *flatten_{itr}*, [*x* BECOME < flat >]
 c. *flatten_{tr}*, [*y* CAUSE [*x* BECOME < flat >]]

- The templates can be linguistically significant via linking rules, figuring into the syntactic, morphological, and modificational behaviors that define verb classes (see e.g. Levin and Rappaport Hovav 1995: 135-154, Wunderlich 1997: 43-53, Van Valin and LaPolla 1997: 139-147).
- If we treat event structures as translations into typed λ -calculus (see e.g. Dowty 1979: 200-205) interpreted like the syntactic structures above, linking rules can ensure the highest argument is the last one taken, that BECOME yields *-en*, etc.:

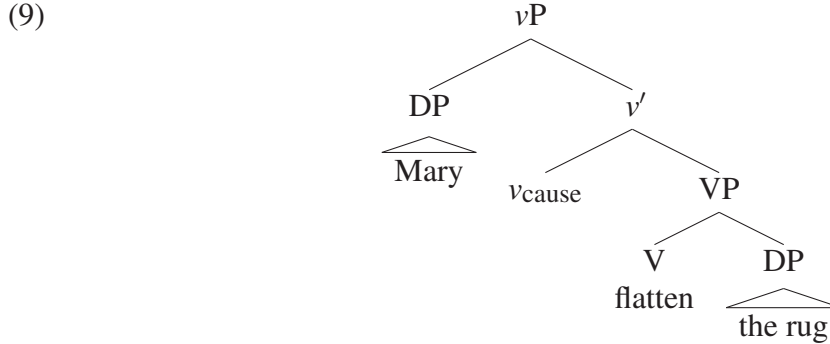
- (6) a. [*flatten_{tr}*] = $\lambda x \lambda y$ [*y* CAUSE [*x* BECOME < flat >]]
 b. [*flatten_{itr}*] = λx [*x* BECOME < flat >]

- Indeed, an analogous treatment could be given for event structures implemented as lexical semantic objects (per Dowty 1979: 264-269).

- (7) a. [open] = $\lambda y \lambda x$ [$\exists P$ [*P*(*x*) CAUSE BECOME **open'**(*y*)]]
 b. [again₁] = λS [**again₁'**(*S*)]
 c. [again₂] = λS [**again₂'**(*S*)]
 d. $\forall y \forall x \forall p$ [**again₂'**([$\exists P$ [*P*(*x*) CAUSE BECOME *p*(*y*)]]) \leftrightarrow [[$\exists P$ [*P*(*x*) CAUSE BECOME **again₁'**(*p*(*y*))]]]

- (8) a. John opened the door again₁ (repetitive)
 $\exists y[\mathbf{again}_1'([\mathbf{door}'(y) \wedge \exists P[P(j) \text{ CAUSE BECOME } \mathbf{open}'(y)]])]$
 b. John opened the door again₂ (restitutive)
 $\exists y[\mathbf{again}_2'([\mathbf{door}'(y) \wedge \exists P[P(j) \text{ CAUSE BECOME } \mathbf{open}'(y)]])] \leftrightarrow \exists y[[\mathbf{door}'(y) \wedge \exists P[P(j) \text{ CAUSE BECOME } \mathbf{again}_1'(\mathbf{open}'(y))]]]$

- The lexicalist vs. syntactified event structures is not binary. Following Kratzer (1996), it could be the argument of v_{cause} is a V denoting change into some lexically specified state.



- However, treating *flatten* as undecomposed will not capture the *again* facts. We need to give V a translation into an inchoative event structure akin to (6b), and utilize some Dowty-style machinery to get restitutive readings. Thus the idiosyncratic root in the lexical semantic sense does not line up with the idiosyncratic morphological root.
- There are of course still other implementational possibilities. For example, Pinker (1989) and Jackendoff (1990) posit no consistently explicit root vs. template distinction.
- However, the representations are still structured in a decompositional way and a root vs. template distinction arises as an emergent generalization over what is shared across verbs' event structures vs. what is unique to those of individual verbs.
- An assumption that cuts across implementations is that the template is what largely determines a verb's grammatical properties, e.g. argument realization or regular morphology.
- Conversely, the lexical semantic root is grammatically less significant, with theories differing in how much grammatical significance a root has (e.g. no role at all as for Borer 2005, 2013, selecting the templates they occur in as per Rappaport Hovav and Levin 1998: 109, Marantz 1997: 217, (15), Alexiadou et al. 2006: 202, (51), Ramchand 2008: 12-15, 57-62, or maybe coming with rich features to control the syntax as per Kelly 2013).
- Perhaps the only truly universally accepted direct grammatical role of the root is that it somehow correlates with the surface verb's idiosyncratic morphological root.
- Although we use syntactic event structures in our book — largely for their clean syntax/semantics interface — *the points we raise apply to **all** event structural approaches*

2 Hypotheses about Root Meaning

- Coming now to our central theme, what defines the semantic contribution of the template vs. the root for any *specific* event structure? Considering a given verb's truth conditional content, how did it come to have that based on the array of event structural elements in it?
- By focusing on the meanings of templatic heads and roots in a *given* event structure we are thus not making any claims about what any of them mean in any abstract sense.
 - Templatic heads and roots could be polysemous or there could be homophony.
 - Roots are sometimes assumed to not have denotations, but instead some abstract “mush”.
- Thus we focus on templatic heads and roots in particular event structures, where a denotation is required, looking at single senses of the surface words they correspond to.
- With roots the view is that they introduce idiosyncratic content filling in specific event details. However, there have been few explicit proposals about what sorts of lexical entailments these can give rise to among the set associated with an entire event structure.
- This is a significant lacuna. As Dowty (1979: 125-126) notes, no matter how confident we are about templatic meanings if there are no constraints on the root meanings such that roots can mean anything then so can the verbs they give rise to. Fleshing out a theory of root meaning is thus important in realizing the predictive power of event structural approaches.
- One difficulty is deducing the template and root for a verb and sussing out each's contribution. Fortunately, the logic of event structural approaches gives us ways to probe this.
 - #1 One way to hone in on root meaning is through the use of sublexical modifiers such as *again*, which can be used in some cases to isolate a root in a given event structure.
- Furthermore, paradigmatic relationships can give us a clue as to root meaning.
 - #2 By default, if we can identify a specific, well-delineated verb class we can take what is common semantically across all verbs in this class to reflect the templatic contribution. Any other meaning in any specific verb must therefore be contributed by the root.
 - (10) a. Mary gave/sent/mailed/left John a book. b. [DP V DP DP] = ???
 - There could be templatic polysemy. Our case studies — change-of-state verbs, ditransitives — are commonly assumed to have a single template or set of templates.
 - #3 Additionally, by default, if we can identify a single root and look at its uses across distinct templates, any common meaning must come from the root, factoring out known templatic meaning and provided other roots do not give rise to this meaning.
 - (11) a. It's flat/It flattened/I flattened it. b. [√FLAT] = ???
 - There could be root polysemy. We avoid positing that unless there is very, very good reason to. For our case studies there is rarely any reason to assume this.
- There have been a few such hypotheses about possible constraints on root meanings.

#1 While it is widely accepted that templates and roots have distinct grammatical roles in the larger event structure, an underexplored question is whether there is an equivalent divide between the meanings that are introduced by roots and by templates.

- The default assumption is that such templatic meanings should be excluded from the largely grammatically irrelevant roots, Embick's (2009: 1) "Bifurcation Thesis for Roots" and Arad's (2005: 79) "Root Hypothesis" (see also Borer 2005, 2013; Dunbar and Wellwood 2016).

(12) *The Bifurcation Thesis of Roots*: If a component of meaning is introduced by a semantic rule that applies to elements in combination [i.e. by a functional head — B/KG], then that component of meaning cannot be part of the meaning of a root.

- If correct, (12) makes very strong predictions about verb classes: Verbs with shared templatic meanings should show identical grammatical properties (modulo lexical idiosyncrasy).
- But (12) need not hold. Goldberg (1995) assumes idiosyncratic verb meanings are subtypes of constructional meanings. Rappaport Hovav and Levin (1998: 109) define root classes in ways that reference templatic notions. Yet it is an open question what would decide the issue.

#2 Are there generalizations regarding what kinds of or how much idiosyncratic meanings a root can have? As a question of the sheer number of distinct lexical entailments a root can have, it is unlikely there are any conditions (Grimshaw 2005: 85).

- But how many *types* of idiosyncratic information can a root have, e.g. more than just one?
- Rappaport Hovav and Levin (2010) suggest not. They claim a verb that describes a change of state never entails a manner and a verb that describes a manner never entails change.
- This follows from two conditions. A root can either describe an action or a state but not both, and a surface verb's event structure can have just one root:

(13) *Manner/Result Complementarity of Roots*: A verb can either have a root modifying a manner predicate and introducing only manner entailments, or root acting as the argument of a change predicate and introducing only state entailments, but not both.

- If (13) holds, it predicts verbs fall into two quite distinct classes, and that predicates that entail both manner and result arise only compositionally (e.g. as resultatives like *sweep clean*).
- But if both come from the root, roots could introduce meanings in "non-canonical" places. Should (13) prove incorrect it would predict wider classes of verbs than typically expected.
- We claim that neither of hypothesis is actually supported, suggesting there are no limits on what kinds of and how much meaning a root can have. We claim this is actually as expected:
 - Idiosyncratic meanings may include templatic or other idiosyncratic entailments because they are defined in terms of them. Violations of (12) and (13) are inescapable.
 - Alternatively, certain state/action plus change/causation combinations are conventional or frequent enough that a root (qua word) gets lexicalized for them.
- All major types of templatic meanings are found in root meanings, crisscrossed with different types of idiosyncratic meaning. The result is a root typology based on how much templatic and idiosyncratic meanings they have, mirroring common event template typologies.

3 Studying Bifurcation: Change-of-state Verbs

- We start with the question of change in the meaning of roots. Bifurcation would have it that change comes from v_{become} and never a root.
- Building on Dixon (1982: 50ff.), we distinguish between verbs whose roots describe Dixon's Property Concept (PC) states (e.g. deadjectival verbs) vs. change-of-state verbs based on Dixon's "states that are the result of some action" (Dixon 1982: 50) (non-deadjectival verbs):

(14) Deadjectival change-of-state verbs (Levin 1993: 245): awaken, brighten, broaden, cheapen, coarsen, dampen, darken, deepen, fatten, flatten, freshen, gladden, harden, hasten, heighten, lengthen, lessen, lighten, loosen, moisten, neaten, quicken, ripen, roughen, sharpen, shorten, sicken, slacken, smarten, soften, stiffen, straighten, strengthen, sweeten, tauten, thicken, tighten, toughen, weaken, widen, ...

(15) *break*-type change-of-state verbs

- a. Levin's (1993:241) *break* verbs: break, chip, crack, crash, crush, fracture, rip, shatter, smash, snap, splinter, split, tear
- b. Levin's cooking verbs (Levin 1993: 243): bake, barbecue, blanch, boil, braise, broil, charbroil, charcoal-broil, coddle, cook, crisp, deepfry, fry, grill, ...
- c. Verbs of killing (Levin 1993: 230ff.; Beavers and Koontz-Garboden 2012): crucify, electrocute, drown, hang, guillotine, ...

- There are morphological and semantic arguments that while deadjectival verbs are built on state-denoting roots lacking any templatic entailments, *break*-type verbs are not, contra the BTR and to general assumptions in the literature (e.g., Hale and Keyser 2002; Embick 2004).

#1 One prediction of the BTR is that barring lexical idiosyncrasy or BTR-orthogonal (e.g. phonological) subregularity, all change-of-state verb roots should show all of the same forms.

- English PC roots have two stative forms: a simple adjective and a deverbal *-en* one.

- (16) a. Look at the bright picture on your left. (=camera took a bright picture)
b. Look at the brightened picture on your left. (e.g. a digitally brightened picture)

- Embick (2004) analyzes these as the same root occurring in two adjectivalizing contexts: just a root with adjectivalizing Asp head, or a verbal structure also including v_{become} :

- (17) a. Basic states (cp. Embick 2004: 363): [_{AspP} Asp $\sqrt{\text{ROOT}}$]
b. Result states (cp. Embick 2004: 367): [_{AspP} Asp_R [_{vP} DP v_{become} $\sqrt{\text{ROOT}}$]]

- Crucially, with result roots there is just one morphological form, the *-en* form.

(18) broken, chipped, cracked, crashed, crushed, fractured, ripped, shattered, smashed, snapped, splintered, split, torn, baked, barbecued, blanched, boiled, braised, ...

- Under the BTR, any stative root should appear in either of (17), yet result roots seem to not appear in (17a). Embick (2004: 358) claims they do, but with them *-ed/en* realizes both Asp and Asp_R, while with PC roots Asp_R is *-ed/en* and Asp null, an accident of English.

#2 However, this makes predictions about meanings of the various stative forms:

- (19) a. Simple adjectives from PC roots (e.g. *red*) will not entail prior change.
 b. Derived adjectives from PC roots (e.g. *reddened*) will entail prior change.
 c. Result root adjectives will not entail prior change (owing to the (17a) reading).
- (19a,b) are borne out, but (19c) is not (Koontz-Garboden 2005, 2010; Deo et al. 2011).
- (20) a. The bright/#brightened photo has never (been) brightened.
 b. The long/#lengthened river has never (been) lengthened.
 c. The red/#reddened dirt has never (been) reddened.
- (21) a. #The shattered vase has never (been) shattered.
 b. #The dead man never died.
 c. #The cooked chicken has never (been) cooked.
- Perhaps we haven't clarified what the relevant simple state would be. However, even taking the simple state to be the "prototypical" one (the outcome of an event had it occurred), we don't get the right reading, e.g. (21a) doesn't improve if one makes pieces that form a vase.
- NB: there is cross-speaker variation: for some speakers *broken* has a "non-functioning" reading not requiring prior change (cp. *closed*, which does not require prior change either). But all that matters for us is that *some* result root adjectives require change.

#3 Another issue is that PC root verbs allow restitutive and repetitive readings with *again*:

- (22) John flattened the rug again.
 a. $[_{VP} \text{ John } [_{V'} v_{\text{cause}} [_{VP} \text{ the rug } [-en_{v_{\text{become}}} [\sqrt{\text{FLAT}} \text{ again}]]]]]$ (restitutive)
 b. $[[_{VP} \text{ John } [_{V'} v_{\text{cause}} [_{VP} \text{ the rug } [-en_{v_{\text{become}}} \sqrt{\text{FLAT}}]]]] \text{ again}]$ (repetitive)
- Yet result roots lack restitutive readings (Rappaport Hovav 2010: 7, Beavers and Koontz-Garboden 2012: 358), even in contexts that should favor one (as best as one can tell):
- (23) [John kills a rabbit, takes it home and skins and butchers it and then puts the fresh meat in the freezer for a week. He then takes it out and puts it on the table to thaw.]
 #John thawed the meat again. (necessarily two defrostings)
- (24) [A store makes their shirts in the back. John buys one and leaves with it, but then decides he does not want it. He takes the shirt back to exchange it.]
 #John returned the shirt again. (necessarily two returnings)
- (25) [John lives in a hot region and finds a fruit with brown, fatty edges. He takes it home, trims off the edges, and puts it in the fridge. He later takes it out and fries it.]
 #John fried the fruit again. (necessarily two fryings)
- That there is a PC/result root distinction calls Bifurcation into question. We now consider how to analyze these facts, both abandoning Bifurcation and preserving it.

4 Analytical option 1: Abandon Bifurcation

4.1 A purely non-lexicalist analysis

- Every time a $\sqrt{\text{CRACK}}$ -type state is asserted a change is there. Maybe change is *part of* the state. If we give up on Bifurcation this is easily statable:

$$(26) \quad \begin{aligned} \text{a. } [\sqrt{\text{FLAT}}] &= \lambda x \lambda s [\text{flat}'(x, s)] \\ \text{b. } [\sqrt{\text{CRACK}}] &= \lambda x \lambda s [\text{cracked}'(x, s)], \text{ where } \forall x \forall s [\text{cracked}'(x, s) \rightarrow \exists e' [\text{become}'(s, e')]] \end{aligned}$$

- Combining these with v_{become} derives the inchoatives in (27a,b).

$$(27) \quad \begin{aligned} \text{a. } [[v_{\text{become}} \sqrt{\text{FLAT}}]] &= \lambda x \lambda e \exists s [\text{become}'(s, e) \wedge \text{flat}'(x, s)] \\ \text{b. } [[v_{\text{become}} \sqrt{\text{CRACK}}]] &= \lambda x \lambda e \exists s [\text{become}'(s, e) \wedge \text{cracked}'(x, s)] \end{aligned}$$

- It is unproblematic that v_{become} and $\sqrt{\text{CRACK}}$ both entail change. The relevant meanings are conjoined and thus it is truth-conditionally equivalent to being introduced just once.
- This analysis makes two key semantic predictions about where the roots diverge.

#1 There can be no result root adjective not entailing change, in contrast with a PC root.

$$(28) \quad \begin{aligned} \text{a. } [\text{Asp}] &= \lambda P [P] \\ \text{b. } [[\text{Asp} \sqrt{\text{FLAT}}]] &= \lambda x \lambda s [\text{flat}'(x, s)] \\ \text{c. } [[\text{Asp} \sqrt{\text{CRACK}}]] &= \lambda x \lambda s [\text{cracked}'(x, s)] \end{aligned}$$

#2 The second prediction concerns the scope of modification with *again*. With result roots on low attachment all of $\sqrt{\text{CRACK}}$ is under *again*, including that the change happened twice. The same is true on higher attachments, so a true restitutive reading is *never* possible.

- Turning to the morphology, we could assume purely stative meanings are unmarked as adjectives while roots entailing change are marked as adjectives:

$$(29) \quad \begin{aligned} &\text{Default realization for Asp with complement X (root } \sqrt{R} \text{ or } vP): \\ \text{a. } &\text{If X does not entail change, then } -\emptyset \quad (\text{PC roots derive unmarked adjectives}) \\ \text{b. } &\text{If X entails change, then } -en/ed \quad (\text{result roots derive marked adjectives}) \end{aligned}$$

- This yields a morphological component to the verbal typology discussed here that again arises from the root and not (solely) the templates the roots occur in.

4.2 A purely lexicalist analysis

- We could analyze this all lexically, but we still end up saying more or less the same things.
- The obvious analysis is that result roots are lexicalized as verbs, where the root has the meaning in (26b), and PC roots as adjectives with the meaning in (26a):

$$(30) \quad \begin{aligned} \text{a. } [\text{crack}_V] &= \lambda x \lambda y \lambda v \lambda e \lambda s \exists P [[P(y, v)] \text{CAUSE} [\text{BECOME}(e, \sqrt{\text{CRACK}}(x, s))]] \\ \text{b. } [\text{flat}_A] &= \lambda x \lambda s [\sqrt{\text{FLAT}}(x, s)] \end{aligned}$$

- #1 If we assume CAUSE and BECOME are defined as semantically equivalent to v_{cause} and v_{become} respectively, this analysis is semantically equivalent to the syntactic one.
- #2 Morphologically, any stative form sharing the same root will have to be derived from the verb, as is transparently the case in languages like English.
- #3 PC words are morphologically simple in their state-denoting use, as in the syntactic analysis.
- #4 These words do not entail change since neither the template nor the root entails it.
- #5 Given a general process of deverbal adjective formation the existence of minimal pairs (e.g. *red* versus *reddened*) is predicted, in contrast to *break* roots.
- #6 Similarly, the Dowty-style lexicalist analysis of sublexical modification would capture the facts, given that the restitutive *again* would still on this analysis scope over a lexical semantic root whose denotation includes change in the case of result roots not in the case of PC roots.

4.3 A mixed analysis

- Another analysis mixes lexicalist and non-lexicalist assumptions: PC roots are lexicalized as adjectives and result roots as verbs, but all word formation is syntactic via functional heads.
- #1 For both kinds of roots, deverbal adjectives would be derived syntactically from the verbs.
 - #2 This analysis comes with a straightforward analysis of restitutive modification: restitutive vs. repetitive modification again arises as a syntactic attachment ambiguity, where restitutive scope is over the underlying adjective of PC verbs but the verbal core of result roots.
 - Such a theory straightforwardly captures the morphological contrasts, much as in the lexicalist analysis, by setting up two grammatical categories of root. Also, like the non-lexicalist analysis, it provides a straightforward explanation of the facts tied to restitutive modification.

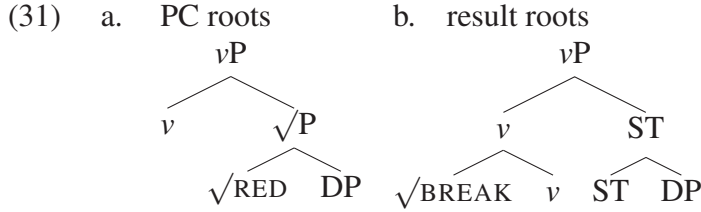
4.4 Summary

- Ultimately, independent of the theoretical particulars, all of these approaches assume roots differ in meaning, which is inconsistent with Bifurcation. The facts follow directly.
- The details of each theory represent the trade-offs different sets of assumptions make in capturing the morphological and sublexical modification facts, though in each case something must be said to capture the basic correlation that (lexical semantic) roots lacking entailments of change form unmarked adjectives and those bearing them form unmarked verbs.
- We next consider analyses that do not reject Bifurcation.

5 Analytical option 2: Preserving Bifurcation

5.1 Reanalyzing result roots as manner entailing

- Embick (2009) considers an analysis of the facts discussed above that would preserve Bifurcation, whereby result roots have a fundamentally different syntactic and semantic status than they do on a more traditional analysis.
- In particular, rather than being state-denoting and having the syntax expected of a state-denoting root as in (31a) for PC roots, result roots have a manner meaning and occur in the position of manner modifiers, i.e. as adjuncts of some v as in (31b) (Embick 2009: 6, 17).



- This theory is *insane*. It is made absent a theory of what exactly manner is or how to test for it. Beavers and Koontz-Garboden (2012, 2020) actually cover this in detail.
- Here's a taste. Manner verbs specify an action of some sort, restricting possible subject DPs.

- (32) a. John scrubbed/wiped the floor with a stiff brush.
 b.??The stiff brush scrubbed/wiped the floor.
 c.??The earthquake scrubbed/wiped the floor.
 d.??The pressure from the water scrubbed/wiped the submerged floor.

- Result verbs allow many subjects (see e.g. Levin and Rappaport Hovav 1995: 85; 102–106):

- (33) a. John broke/shattered the vase with a hammer.
 b. The hammer broke/shattered the vase.
 c. The earthquake broke/shattered the vase.
 d. The pressure from the water broke/shattered the windows of the submerged car.

- If there *is* manner there it is unclear what it would be. Absent a more specific claim, the better assumption is that there is no manner, consistent with the orthodox view.

5.2 Allosemy

- A core problem for Bifurcation is that just as PC roots appear in basic adjective structures like (34a) we also expect result roots to as well as in (34a), contrary to fact.



- A possible solution comes from an allosemy analysis (Myler 2014 and Wood and Marantz 2015), whereby functional heads can vary in their meaning depending on their syntactic context. Suppose there are actually two different interpretations for Asp, as in (35).

- (35) a. $[\text{Asp}] = \lambda P[P]$ (arises with $\sqrt{\text{FLAT}}$)
 b. $[\text{Asp}] = \lambda P \lambda x \lambda s [P(x, s) \wedge \exists e' [\text{become}'(s, e')]]$ (arises with $\sqrt{\text{CRACK}}$)

- This gets the semantics right, but not the *again* facts. We could posit that (a) all verbs involve AspP (they are all deadjectival) and (b) *again* scopes over just AspP. However:

- #1 This relies on novel and as yet unmotivated theories of the syntax of change-of-state verb formation and restitutive modification.
- #2 Why do PC roots have basic adjectives that result roots tend lack? If result roots do appear in basic state structure as PC roots, why do we not see overt evidence of it?
- #3 Where should idiosyncrasy reside in the grammar? The allosemy theory puts it in the syntax. It may be a matter of taste, but our hunch is that this is the role of roots.

5.3 Root selection for syntactic construction

- Another analysis is that roots select for template they appear in (Alexiadou et al. 2006: 202, (51) and Ramchand 2008: 12-15, 57-62), and result roots reject *again* modification. We are unsure what would motivate these root-specific syntactic stipulations, which mimic the semantics rather than directly reflect it. It would also have to replicate across languages.

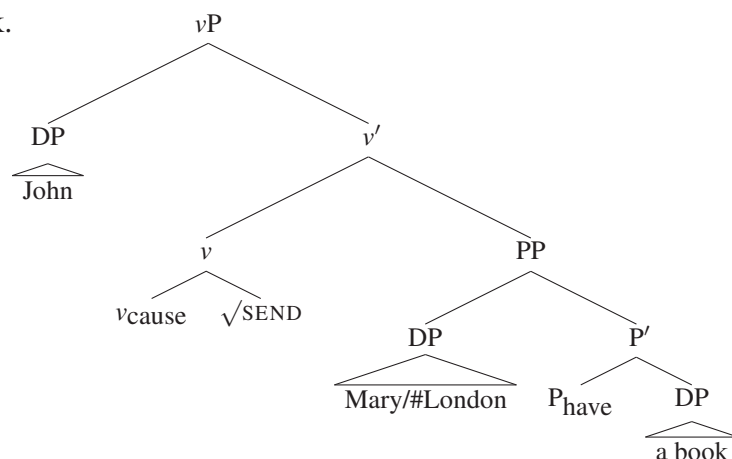
5.4 Change-of-state Summary

- No matter how you slice it, roots of some change-of-state verbs entail change. Any way around it will lead to stipulations we may not want. This is also true no matter what event structural framework you want. This insight cross cuts individual formal models.

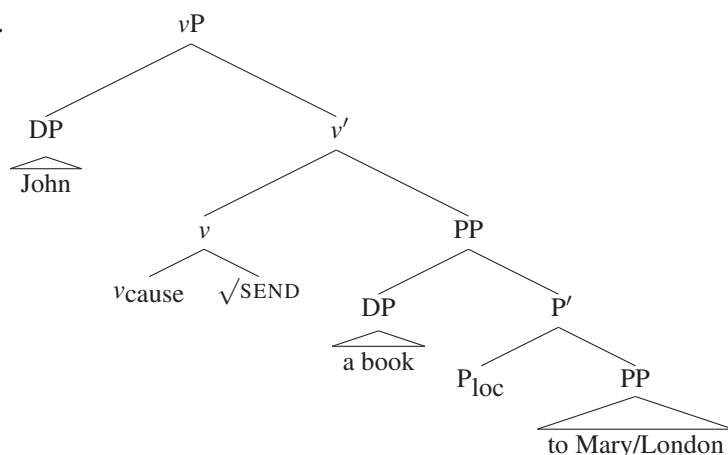
6 Ditransitives

- Harley (2003) decomposes ditransitives into v_{cause} with a manner root modifier and PP complement defining possession or co-location, i.e. the dative alternation (cf. Pylkkänen 2008):

(36) a. John sent Mary/#London a book.



b. John sent a book to Mary/London.



- These structures explain different semantic and binding facts (Larson 1988):

(37) a. John sent [every owner $_i$ [her $_i$ check]/[every check $_i$ [to [its $_i$ owner]].
 b. *John sent [its $_i$ owner] [every $_i$ check]/*[her $_i$ check] [to [every owner $_i$]].

- Beavers and Koontz-Garboden (2020) argue that the templates are highly unspecified; the root fills in templatic details like possession and co-location, again contra Bifurcation.

7 Root Sensitivity in English Ditransitives

- Pinker (1989) (and Green 1974) identifies several ditransitive types, including:

- (38) a. **Verbs that inherently signify acts of giving:** *give, pass, hand, sell, pay, trade, lend, loan, serve, feed*
b. **Verbs of sending:** *send, mail, ship*
c. **Verbs of instantaneous causation of ballistic motion (Verbs of throwing):** *throw, toss, flip, slap, kick, poke, fling, shoot, blast*
d. **Verbs of continuous causation of accompanied motion in a deictically specified direction:** *bring, take*
e. **Verbs of future having:** *offer, promise, bequeath, leave, refer, forward, allocate, guarantee, allot, assign, allow, advance, award, reserve, grant*
f. **Verbs of instrument of communication:** *radio, email, telegraph, wire, telephone, netmail, fax*
- (39) a. **Verbs of fulfilling:** *credit, present, entrust, supply, trust*
b. **Verbs of continuous causation of accompanied motion in some manner:** *carry, pull, push, schlep, lift, lower, haul*

IO: Only giving verbs (e.g. *give, hand, pass (salt)*) actually *require* possession with IOs. For all others it is cancelable, though *prospective* possession is required (Gropen et al. 1989):

- (40) a. #John gave/loaned Mary the salt, but she never got it.
b. John sent/threw Mary/#London the ball, but it flew off course before she got it.

- However, some roots also add arrival (contra Krifka 2004) — a template notion.

- (41) #John handed Mary the ball, but it never left his hand/he never gave it up.

to: Arrival is sometimes required, as with accompanied motion (e.g. *carry*), and sometimes not, as with ballistic motion (e.g. *throw*), though it is prospective.

- (42) a. #John carried/brought the treaty to the council, but it did not arrive.
b. Kim threw/tossed the ball to Sandy, but the wind blew it into the bushes.
c. [Kim and Sandy are separated by an unbreakable glass wall Kim is aware of.]
#Kim threw/tossed the ball to Sandy.

- However, *to* frames with giving and future having verbs (e.g. *bequeath*) **lack** motion meanings, encoding instead (prospective) possession, and thus showing no alternation contrast.

- (43) John gave/bequeathed/credited the money to Mary/#London. (no motion required)

- We could assume caused possession is abstract arrival (Jackendoff 1996). However, there is no initial possession and thus no possessor “path” (Rappaport Hovav and Levin 2008).

- (44) I gave him the creeps/the wall a fresh coat of paint (*gave the ball from Bill)

- Rather, caused possession is a transition from the recipient not having to having the theme. Thus the real results are *possible* P_{have} and *possible* $P_{R'}$, where $P_{R'}$ covers both P_{have} or P_{loc} .

Any other event structural-type meaning *must* come from the root.

- Now, crucially, as we have already seen, sometimes the choice of root sometimes makes one of the two constructions mean the other construction, and sometimes not.

- (45) a. John sent a book to Mary/London. \neq John sent Mary/#London a book.
b. John willed his fortune to Mary/#London. $=$ John willed Mary/#London his fortune.

- The future having verb roots entail the meaning entailed by the IO template, and giving roots entail something even stronger — actual having — thus also entail possible having. *Hand* and ballistic and accompanied motion entail possible or actual arrival, also templatic notions.

\therefore Thus roots entail templatic notions like receiving and arriving, violating Bifurcation.

8 Analyzing English Ditransitives

- In Beavers and Koontz-Garboden (2020) we outline a detailed compositional analysis of these facts, largely as a proof of concept that it is compositional since it could seem weird. I'll just give the basic ingredients. Caused possession/arrival predicates relate four entities:

- (46) a. an event e b. a causer x c. a theme y d. a recipient/goal z

- Starting with (36), we assume propsectivity comes from a causal v (see e.g. Tatevosov 2008: 410) via a modal \Diamond (the result obtains at some world; cf. Koenig and Davis 2001; Beck and Johnson 2004; Beavers 2011), where the modal base includes the reference world:

- (47) $[v_{\Diamond \text{cause}}] = \lambda P \lambda x \lambda v [effector'(x, v) \wedge \Diamond \exists e [cause'(v, e) \wedge \exists s [become'(s, e) \wedge P(s)]]]$
“ x is the effector of event v where in some possible world v causes an event e in which a state s comes about in which P is true.”

- Following Beavers (2011: 31) we divide changes into monadic changes and dyadic changes:

- (48) a. $broken'(y, s)$ b. $have'(y, z, s)$ (“ z has y in s ”) c. $at'(y, z, s)$ (“ y is at z in s ”)

- We thus define the meaning of the two major result heads as follows:

- (49) a. $[P_{\text{have}}] = \lambda y \lambda z \lambda e [have'(y, z, e)]$
b. $[P_{\text{loc}}] = \lambda z \lambda y \lambda e [R'(y, z, e)]$, where $[R'(y, z, e) \leftrightarrow [have'(y, z, e) \vee at'(y, z, e)]]$

- Absent a root, the meaning of the two templates, when the heads are composed and applied to definite XPs whose meanings are x (causer), y (theme), and z (goal/recipient), is:

- (50) a. $[[_{vP} DP_x v_{\Diamond \text{cause}} [pp DP_z [p' P_{\text{have}} DP_y]]]$
= “There is an event v of which x is the effector and in some possible world v causes an event e in which a state s comes about in which z have y .”
b. $[[_{vP} DP_x v_{\Diamond \text{cause}} [pp DP_y [p' P_{\text{loc}} PP_z]]]$
= “There is an event v of which x is the effector and in some possible world v causes an event e in which a state s comes about in which y is at z .”

- We claim ditransitive roots define a manner M' for the causer plus also possibly information Q' about the templatic result predicate's theme and goal/recipient.

- Now, here's the trick: when the manner root merges with $v_{\Diamond\text{cause}}$ the theme and recipient *have already composed with the P head to form a PP!* They should be inaccessible...
- ... except that the event variable e is accessible, and from that we can recover what s is by using an ι operator, and from that we can ask what the theme and recipient of s are using ι !
- So we defined functions th' and rg' that for any stative predicate P return the theme and recipient/goal respectively, and assumed roots are adjoined to $v_{\Diamond\text{cause}}$:

$$(51) \quad [\sqrt{\text{ROOT}}] = \lambda P \lambda x \lambda v [M'(v) \wedge Q'(th'(P), rg'(P))]$$

- Throwing root information into (50) gives us:

- (52) a. $[[_{vP} DP_x [_{v'} [v v_{\Diamond\text{cause}} \sqrt{\text{ROOT}}] [_{PP} DP_z [_{P'} P_{\text{have}} DP_y]]]]$
= "There is an event v of which x is the effector and x acts in some manner M' and in some possible world v causes an event e in which state s comes about in which z has y plus also some other information Q' holds between z and y ."
- b. $[[_{vP} DP_x [_{v'} [v v_{\Diamond\text{cause}} \sqrt{\text{ROOT}}] [_{PP} DP_y [_{P'} P_{\text{loc}} PP_z]]]]$
= "There is an event v of which x is the effector and x acts in some manner M' and in some possible world v causes an event e in which state s comes about in which y is at z plus also some other information Q' holds between z and y ."

- To illustrate a root, consider *give*, which entails actual possession in both constructions:

- (53) a. Mary gave John the book, #but he never got it.
b. Mary gave the book to John, #but he never got it.

- We propose that $\sqrt{\text{GIVE}}$ has the denotation in (54):

$$(54) \quad [\sqrt{\text{GIVE}}] = \lambda P \lambda x \lambda v [\text{giving}'(v) \wedge \exists e [\text{cause}'(v, e) \wedge \exists s [\text{become}'(s, e) \wedge \text{have}'(th'(P), rg'(P), s)]]] \text{ "Event } v \text{ is a giving that causes an event } e \text{ in which a state } s \text{ comes about in which the recipient of } P \text{ has the theme of } P \text{ at the real world."}$$

- *John gave Mary the book* thus entails that John acts in a way that causes Mary to have the book in the real world (from (54)) and also have it in some possible world (from (52a)).
- But since actual receiving entails prospective receiving, this amounts to saying John acts in a way that causes Mary to have the book. The root's result is strictly stronger than the template's result, and thus the root strengthens what was in the template.
- Furthermore, the result entailed by the root also subsumes that of the *to* template as well (since for all y, z, s $\text{have}'(y, z, s)$ entails $R'(y, z, s)$). Thus analogously to above, the meaning of *Mary gave a book to John* will ultimately resolve to the same meaning.
- If we look at our root classes, we have four, defined in terms of the manners they represent, which have as a subpart of their meaning specific results, which subsume the templates:

(55)

Specificity of Lexical Entailments per Root						
Example	Root (M')	Lexical Class (Q')		Template		Frame
$\sqrt{\text{GIVE}}$	Manners of giving	\supset	actual having	\supset	$\Diamond \text{have}' \supset \Diamond R'$	IO/to
$\sqrt{\text{BEQUEATH}}$	Manners of obliging to give	\supset	possible having	\supset	$\Diamond \text{have}' \supset \Diamond R'$	IO/to
$\sqrt{\text{CARRY}}$	Manners of accomp. motion	\supset	actual be at	\supset	$\Diamond R'$	to
$\sqrt{\text{THROW}}$	Manners of releasing	\supset	possible be at	\supset	$\Diamond R'$	to

9 The Equivalence of English IOs and Kinyarwanda AOs

- But the English IO is limited, occurring with roots that indicate manners of caused possession (and creation verbs on a beneficiary reading). It could be written off as a lexicalized quirk.
- We examine ditransitives in Kinyarwanda (Rwanda; Bantu), where IOs correspond to applied objects (AO) of (low) applicative *-ir* (see e.g. Kimenyi 1980 and Jerro 2016b):

- (56) a. *Nkusi y-a-juguny-e umu-pira.*¹
 Nkusi 1S-PST-throw-PRFV 3-ball
 ‘Nkusi threw the ball.’
 b. *Nkusi y-a-juguny-iy-e Karemera umu-pira.*
 Nkusi 1S-PST-throw-APPL-PRFV Karemera 3-ball
 ‘Nkusi threw the ball to Karemera.’

- English IOs and Kinyarwanda *-ir* AOs share some core features. AOs with caused possession verbs must be animate (e.g. *Kigali* is disallowed unless interpreted as “The Kigali Office”):

- (57) a. *#Nkusi a-ri-mo ku-junguy-ir-a umu-pira i Kigali.*
 Nkusi 1S-COP-LOC INF-throw-APPL-IMP 3-ball 23 Kigali
 ‘Nkusi throwing the ball to Kigali.’
 b. *#Nkusi y-a-gabur-iy-e aka-rere ibi-ryo.*
 Nkusi 1S-PST-serve-APPL-PRFV 12-district 8-food
 ‘Nkusi served the district food.’

- Second, AOs asymmetrically c-command thematic objects (TOs) just as English IOs to DOs (which is surprising because Kinyarwanda is a famously symmetric language where AOs and TOs share objecthood properties; see e.g. Kimenyi 1980 and Jerro 2016b:172ff for more):

- (58) a. *N-a-juguny-iy-e buri mu-gabo uru-funguzo rwe.*
 1SGS-PST-throw-APPL-PERF every 1-man 11-key 11.his
 ‘I threw each man his key.’
 b. **N-a-juguny-iy-e buri ru-funguzo umu-gabo wayo.*
 1SGS-PST-throw-APPL-PERF every 11-key 1-man 1.its
 ‘I threw each key to its man.’
 c. *?N-a-juguny-iy-e im-funguzo ze buri mu-gabo.*
 1SGS-PST-throw-APPL-PERF 10-key 10.his every 1-man
 ‘I threw his keys to each man.’
 d. **N-a-jugun-iy-e umu-gabo wayo buri ru-funguzo.*
 1SGS-PST-throw-APPL-PERF 1-man 1.its every 11-key
 ‘I threw every key to its man.’

∴ This suggests an equivalence of AOs and English IOs, justifying a comparison.

¹Kinyarwanda has various relevant morphophonological interactions. Vowel harmony determines the quality of the applicative’s vowel (*e* vs. *i*). The perfective suffix causes consonant mutations at the end of the verbal stem, which often turns */-ir/* to */-ij/* (represented orthographically as “iy”). Past tense is the segment *a-* before the verb stem, but with vowel-initial stems, this segment is not represented in the orthography, but for clarity we represent it as \emptyset . There are various allomorphs of the perfective (*-e*, *-ye*, *-eye*, *-eye*), and the form corresponds to the consonant of the stem.

- More roots take AOs than English IOs, and thus *-ir* clearly reflects a general templatic head. Nonetheless, the verb's meaning depends on roots in ways that defy Bifurcation.
- The root of interest are change-of-state (59a) and ditransitive (59b-h) (adapted from above).

- (59) a. **Verbs of change-of-state:** *kumena* 'break', *guseniyuka* 'destroy', *kuvuna* 'snap (break)'
- b. **Verbs that inherently signify acts of giving:** *guha* 'give', *guhweza* 'hand/pass', *gutiza* 'lend', *kugabura* 'serve'
- c. **Verbs of sending:** *koheriza* 'send', *gutuma* 'send someone'
- d. **Verbs of instantaneous causation of ballistic motion (Verbs of throwing):** *gutera* 'throw', *kujugunya* 'throw'
- e. **Verbs of continuous causation of accompanied motion in a deictically specified direction:** *kuzana* 'bring', *kujyana* 'take'
- f. **Verbs of future having:** *kuraga* 'leave (inheritance)', *gusiga* 'leave'
- g. **Verbs of fulfilling:** *kubitsa* 'deposit'
- h. **Verbs of continuous causation of accompanied motion in some manner:** *gusunika* 'push', *gukurura* 'pull'

10 Monotransitive Base Verbs and Applicativization

10.1 The Broad Thematic Role of the AO

- Unlike English IOs, *-ir* AOs in Kinyarwanda occur with any transitive change verb. However, with canonical change-of-state verbs (59a) the AO is a beneficiary and not a recipient:

- (60) a. *Mukamana y-a-menny-e* (*Karemera) *igi-kombe*.
Mukamana 1S-PST-break-PRFV Karemera 7-cup
'Mukamana broke the cup.'
- b. *Mukamana y-a-men-ey-e* Karemera *igi-kombe*.
Mukamana 1S-PST-break-APPL-PRFV Karemera 7-cup
'Mukamana broke the cup on behalf of Karemera/#to Karemera'.

- A recipient AO is only licensed with certain roots, viz. translation equivalents of English caused possession ditransitives among (59b-h) (though a beneficiary AO is also possible):

- (61) a. *Mukamana y-a-juguny-e* (*Nkusi) *umu-pira*.
Mukamana 1S-PST-throw-PRFV Nkusi 3-ball
'Mukamana threw the ball.'
- b. *Mukamana y-a-juguny-iy-e* Nkusi *umu-pira*.
Mukamana 1S-PST-throw-APPL-PRFV Nkusi 3-ball
'Mukamana threw the ball to Nkusi.'
- (62) a. *Habimana y-a-gabuy-e* *ibi-jumba* (*aba-na).
Habimana 1S-PST-serve-PRFV 8-sweet.potatoes 2-children
'Habimana served sweet potatoes.'

- b. *Gatete y-a-gabur-iy-e ibi-jumba aba-na.*
 Gatete 1S-PST-serve-APPL-PRFV 8-sweet.potatoes 2-children
 ‘Gatete served the children sweet potatoes.’

- We must demonstrate that receiving and benefiting are distinct. Applied variants of canonical change verbs are compatible with contexts with benefiting/malefiting but no receiving:

- (63) a. [Nkusi is bound to his bed, and wants to see the beautiful mountain view outside, but there’s a tree blocking the view. Karemera cuts it down and discards it.]
Karemera y-a-kat-iy-e igi-ti Nkusi.
 Karemera 1S-PST-cut-APPL-PRFV 7-tree Nkusi
 ‘Karemera cut the tree on behalf of Nkusi.’

- b. [Karemera accidentally broke a window that belonged to Nkusi.]
Karemera y-a-men-ey-e Nkusi i-dirishya.
 Karemera 1S-PST-break-APPL-PRFV Nkusi 5-window
 ‘Karemera broke the window to the disaffection of Nkusi.’

- Conversely, the other monotransitive roots allow receiving without benefiting:

- (64) a. [I need to give Nkusi a mango, but he’s on the other side of the room.]
N-a-juguny-iy-e Habimana umw-embe ngo
 1SGS-PST-throw-APPL-PRFV Habimana 3-mango so.that
a-wu-juguny-ir-e Nkusi.
 1S-3O-throw-APPL-PRFV Nkusi
 ‘I threw the mango to Habimana so he could throw it to Nkusi.’

- b. [I need to send Nkusi a letter, but I can’t send any mail internationally, so I first send it to Habimana to then send it to Nkusi]
N-∅-oher-er-ej-e Habimana i-barwa ngo
 1SGS-PST-send-APPL-IMB-PRFV Habimana 5-letter so.that
a-ry-oher-er-ez-e Nkusi.
 1S-5O-throw-APPL-IMB-PRFV Nkusi
 ‘I send the letter to Habimana so he could send it to Nkusi.’

∴ The broad thematic role of the AO is contingent at least partly on the root.

10.2 The Syntax and Semantics of the Non-Applicativized Monotransitives

- While some non-applied monotransitives allow oblique XPs akin to English *to* PPs, others do not (See Jerro 2016a, 2018a on the status of locative XPs in Kinyarwanda.)

- (65) a. *Mukankusi y-a-juguny-e umu-pira kuri Gatete.*
 Mukankusi 1S-PST-throw-PRFV 3-ball 17 Gatete
 ‘Mukankusi threw the ball at Gatete.’
- b. *Mukankusi y-∅-oherej-e igi-tabo (*kuri Gatete).*
 Mukankusi 1S-PST-send-PRFV 7-book 17 Gatete
 ‘Mukankusi sent the book (*to Gatete).

- Regardless, base monotransitive verbs with a recipient AO always entail that there is an implicit third participant absent the AO, e.g. the theme ends up elsewhere in (66):

- (66) a. *#Nkusi y-a-juguny-e umu-pira ariko Nkusi*
 Nkusi 1S-PST-throw-PRFV 3-ball but Nkusi
a-ra-cya-wu-fit-e.
 1S-NON.PST-PERS-3O-have-PRFV
 ‘Nkusi threw the ball, but Nkusi still has it.’
- b. *#Nkusi y-∅-oherej-e im-pano ariko a-ra-cya-yi-fit-e.*
 Nkusi 1S-PST-send-PRFV 9-gift but 1S-NON.PST-PERS-9O-have-PRFV
 ‘Nkusi sent the gift, but he still has it.’

- Crucially, sometimes it is an implicit recipient, sometimes a goal, contingent on the root:

- (67) a. [Karemera is making a fancy cake for a competition. Nobody will eat the cake, it’s just going to be displayed.]
#Karemera y-a-gabuy-e cake.
 Karemera 1S-PST-serve-PRFV cake
 ‘Karemera served the cake.’
- b. [Habimana is a spy and sends a microphone in a letter to record people without them knowing. There is no specific person he is sending it to]
Habimana y-∅-oherej-e i-barwa.
 Habimana 1S-PST-send-PRFV 9-letter
 ‘Habimana sent the letter.’

- Conversely, canonical change-of-state verbs do not entail a beneficiary absent the AO:

- (68) *Nkusi y-a-menny-e igi-kombe.*
 Nkusi 1S-PST-break-PRFV 7-cup
 ‘Nkusi broke the cup (#to the benefit of someone else).’

∴ The roots of recipient AO verbs entail a third participant and define its role. This includes notions of co-location and possession that are supposedly templatic.

10.3 Entailments of Change of State

- Generally, with recipient AO monotransitive roots receiving by/arriving at the (contextually defined) recipient/goal is always cancelable both with and without an AO:

- (69) a. [Karemera sent the letter to his school, but it got lost in the mail]
Karemera y-∅-oherej-e i-barwa
 Karemera 1S-PST-send-PRFV 5-letter
 ‘Karemera sent the letter.’
- b. [Karemera sent the letter to Nkusi, but it got lost in the mail]
Karemera y-∅-oher-er-ej-e i-barwa Nkusi
 Karemera 1S-PST-send-APPL-IMB-PRFV 5-letter Nkusi
 ‘Karemera sent the letter to Nkusi.’
- (70) a. [Nkusi intended to throw the ball into the basket, but the wind blew it away]
Nkusi y-a-juguny-e umu-pira.
 Nkusi 1S-PST-throw-PRFV 3-ball
 ‘Nkusi threw the ball.’
- b. [Nkusi throws a ball to Karemera, but the wind blows it over the fence]
Nkusi y-a-juguny-iy-e Karemera umu-pira.
 Nkusi 1S-PST-throw-APPL-PRFV Karemera 3-ball
 ‘Nkusi threw the ball to Karemera.’

- Yet loss/leaving *is* usually entailed, with some root-by-root variation:

- (71) a. #*Nkusi y-∅-oher-er-ej-e Karemera im-pano ariko Nkusi*
 Nkusi 1S-PST-send-APPL-IMB-PRFV Karemera 9-gift but Nkusi
a-ra-cya-yi-fit-e.
 1S-NON.PST-PERS-9O-have-PRFV
 ‘Nkusi sent the gift to Karemera, but Nkusi still has it.’
- b. #*Nkusi y-∅-oherej-e im-pano ariko a-ra-cya-yi-fit-e.*
 Nkusi 1S-PST-send-PRFV 9-gift but 1S-NON.PST-PERS-9O-have-PRFV
 ‘Nkusi sent the gift, but he still has it.’
- (72) a. *Nkusi y-a-zany-e aga-seke, ariko Nkusi*
 Nkusi 1S-PST-bring-PRFV 12-basket but Nkusi
a-ra-cya-ga-fit-e.
 1S-NON.PST-PERS-12O-have-PRFV
 ‘Nkusi brought the little basket, but he still has it.’
- b. *Nkusi y-a-zan-iy-e aga-seke Karemera ariko Nkusi*
 Nkusi 1S-PST-bring-APPL-PRFV 12-basket Karemera but Nkusi
a-ra-cya-ga-fit-e.
 1S-NON.PST-PERS-12O-have-PRFV
 ‘Nkusi brought the little basket to Karemera, but Nkusi still has it.’ (e.g. maybe we’re at a wedding and it’s not time to give gifts yet, so you still have it.)

∴ Entailments of loss and leaving — two types of change — are root, not template defined.

11 Lexical Ditransitives

11.1 Lexical Ditransitives and Indirect Objects

- Roots among (59b,d,g) allow additional objects without *-ir* (IOs) with a root-contingent role:

- (73) a. *N-a-ha-ye Mukankusi igi-tabo.*
 1SGS-PST-give-PRFV Mukankusi 7-book
 ‘I gave Mukankusi the book.’ (recipient IO)
- b. *Nkusi y-a-siz-e igi-tabo i Kigali.*
 Nkusi 1S-PST-leave-PRFV 7-book 19 Kigali
 ‘Nkusi left a book in Kigali.’ (goal IO)

- With the *guha* ‘give’ type the Kigali Office effect obtains, and in general we see the same asymmetric c-command facts suggesting an equivalence to AO (and English IO) structures:

- (74) a. *#Nkusi y-a-hay-e Kigali i-barwa.*
 Nkusi 1S-PST-give-PRFV Kigali 9-letter
 Intended: ‘Nkusi gave Kigali the letter.’
- b. *#Nkusi y-a-herej-e Muhanga ama-faranga.*
 Nkusi 1S-PST-hand-PRFV Muhanga 6-money
 Intended: ‘Nkusi handed money to Muhanga District.’
- (75) a. *N-a-ha-ye buri mu-gabo ama-faranga ye.*
 1SGS-PST-give-PRFV every 1-man 6-money 6.its
 ‘I gave every man his money.’
- b. **N-a-ha-ye ama-faranga ye buri mu-gabo.*
 1SGS-PST-give-PRFV 6-money 6.its every 1-man
- c. **N-a-ha-ye umu-gabo ye buri ma-faranga.*
 1SGS-PST-give-PRFV 1-man 1.its every 6-money
- d. **N-a-ha-ye buri ma-faranga umu-gabo ye.*
 1SGS-PST-give-PRFV every 6-money 1-man 1.its

- This suggests a broad apples-to-apples comparison with English IOs and also AOs.

11.2 Applicativizing Lexical Ditransitives

- The effect of adding *-ir* to a lexical ditransitive is root contingent. With most the AO is a new benefactive while the IO remains a recipient (thus creating a tritransitive), but with *gu-siga* ‘to leave’ and *gu-tera* ‘throw at’ the goal IO becomes a recipient AO, forming a ditransitive:

- (76) a. *N-a-h-er-ey-e Nkusi igi-tabo Habimana.*
 1SGS-PST-give-APPL-PRFV Nkusi 7-book Habimana
 ‘I gave Habimana the book for Nkusi.’ (not: ‘I gave Habimana Nkusi the book’)
- b. *Nkusi y-a-sig-iy-e Gatete igi-tabo.*
 Nkusi 1S-PST-leave-APPL-PRFV Gatete 7-book
 ‘Nkusi left Gatete a book.’

∴ For lexical ditransitives the semantic and grammatical effects of adding *-ir* are root-contingent.

11.3 Entailments of Change Among Lexical Ditransitives

- These roots again vary in whether arriving/receiving and loss/leaving are entailed (we do not give tritransitives since the addition of a beneficiary does not change the underlying event):

- (77) a. [I go to give Nkusi the book, but Karemera slaps it out my hand]
#N-a-ha-ye/n-a-herej-e *Nkusi igi-tabo.*
 1SGS-PST-give-PRFV/1SGS-PST-hand-PRFV Nkusi 7-book
 ‘I gave/handed Nkusi the book.’
- b. *N-a-raz-e* *ama-faranga Olivier, ariko Olivier ntabwo*
 1SGS-PST-bequeath-PRFV 6-money Olivier but Olivier NEG
y-a-y-akiriy-e.
 1S-PST-6O-receive-PRFV
 ‘I left the money for Olivier, but he didn’t receive it.’
- (78) a. *#Nkusi y-a-herej-e* *igi-tabo Karemera, ariko Nkusi*
 Nkusi 1S-PST-hand-PRFV 7-book Karemera but Nkusi
a-ra-cya-gi-fit-e.
 1S-NON.PST-PERS-7O-have-PRFV
 ‘Nkusi handed the book to Karemera, but Nkusi still has it.’
- b. *Nkusi y-a-raz-e* *ama-faranga aba-na be ariko*
 Nkusi 1S-PST-bequeath-PRFV 6-money 2-child 2.his but
a-ra-cya-ya-fit-e.
 1S-NON.PST-PERS-6O-have-PRFV
 ‘Nkusi bequeathed his children the money, but he still has it.’

- There can also be receiving but no loss/leaving, e.g. if Nkusi is a judge in a competition, so the reading is caused possession not transfer:

- (79) *Nkusi y-a-mp-a-ye* *ama-nota icumi.*
 Nkusi 1S-PST-give-PRFV 6-points ten
 ‘Nkusi gave me ten points.’ (no prior possessor of the ten points)

12 Interim Summary

- We have observed at least five types of roots in terms of their non-applicativized variants. The templates have very general meanings, so the roots define the actual change:

(80)	example	root type	third participant	Applicative effect
	<i>gu-ha</i> ‘give’	ditransitive	recipient IO	add beneficiary AO(≠IO)
	<i>gu-siza</i> ‘leave’	ditransitive	goal IO	IO becomes recipient AO
	<i>ku-gabura</i> ‘serve’	monotransitive	unexpressed recipient	AO realizes recipient
	<i>ku-jugunya</i> ‘throw’	monotransitive	unexpressed goal	goal becomes recipient AO
	<i>kumena</i> ‘break’	monotransitive	none	add beneficiary AO
(81)	a. AO template: caused possible receiving or benefiting			(cp. English IO)
	b. IO template: caused possible receiving or possible arriving			(cp. English <i>to</i>)
	c. Monotransitive template (with optional location XP): caused (possible) change			

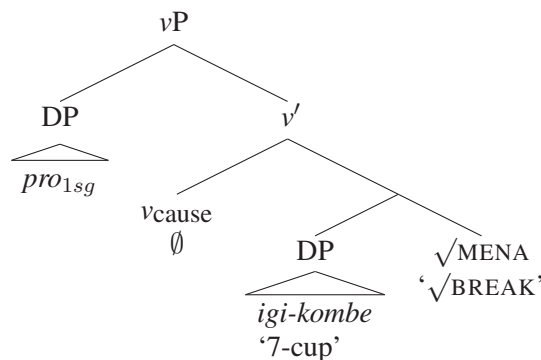
∴ Thus possession and co-location (and possibly even change) — templatic meanings associated with functional heads on previous accounts — can be root meanings, contra Bifurcation.

13 Analyzing Kinyarwanda Ditransitives

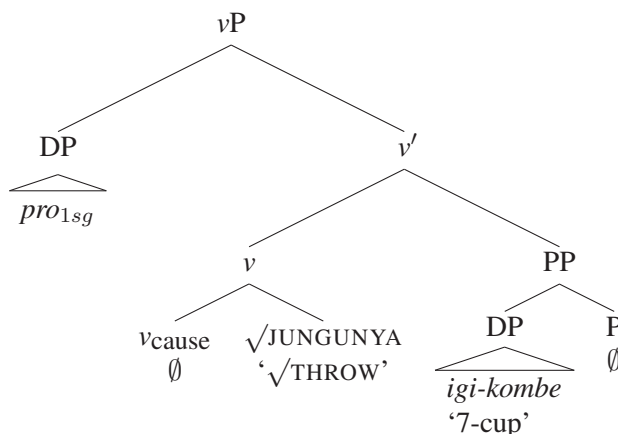
13.1 Monotransitive Base Verbs

- We assume monotransitive change-of-state verbs have root-defining states, but recipient AO roots are akin to (36), save that P head takes just a theme, deriving monotransitivity.

(82) a.



b.



- The P-head is like a state-denoting root, albeit relating the theme to an implicit R' participant:

- (83) a. $[\checkmark\text{MENA}] = \lambda y \lambda s [\text{broken}'(y, s)]$ (one participant in s)
 b. $[\text{P}] = \lambda y \lambda s \exists z [R'(y, z, s)]$ (two participants in s)

- We use the basic English analysis of $v_{\diamond\text{cause}} + \text{root}$. It's a bit trickier here because the recipient is existentially bound — unlike English where it'd be overt — but there are ways around that. Without getting into the compositional details, we have two types of manner roots as in (84) vis-a-vis the implicit argument (here the state P is whatever came from the PP).

- (84) a. $[\checkmark\text{GABURA}]$ ('serve') = "The agent x performed a serving event v that possibly caused an event e which culminated in a state s of the recipient of the state P having the theme of state P ."
- b. $[\checkmark\text{JUNGUNYA}]$ ('throw') = "The agent x performed a throwing event v that caused an event e wherein the theme of state P is with x at the initial state of e and culminates in a state s where the theme of state P is with something else and v possibly caused an event e which culminated in a state s of the recipient of the state P having the theme of state P ."

- Note that each root adds a *specific* result state: actual having for the 'serve' root and actual releasing for 'throw'. The result is what you'll get the correct (simplified) reading for these:

- (85) *N-a-menny/juguny/gabuy-e igi-kombe.*
 1SGS-PST-break/throw/serve-PFV 7-cup
 ‘I broke/threw/served a cup.’
- ‘I caused the cup to be in a broken state.’
 - ‘I released the cup through some ballistic action and it is now at some place z .’
 - ‘I performed a serving that resulted in some person z actually having the cup.’

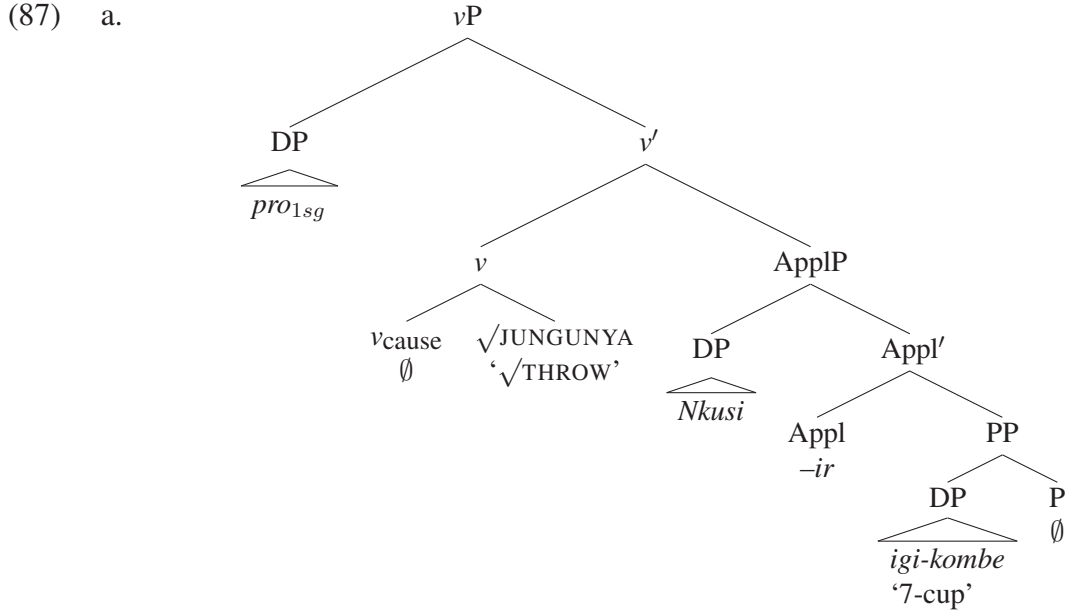
- This is all like English save that the recipient is not named. It is *existentially bound*.

13.2 The Semantics of The Applicative

- We assume all changes can have a beneficiary, i.e. the outcome can benefit someone, and it can be added to any sate, making it dyadic if not already. We generalize over recipients and beneficiaries qua animate(-like) second participant of dyadic changes:

(86) $B'(z, s)$ is true iff $\exists y[have'(y, z, s)]$ or $benefit'(z, s)$ (‘ z benefits from s ’) is true.

- We assume *-ir* applies between v_{cause} and P, adding a B' argument:



b. $[-ir] = \lambda P \lambda r \lambda s [B'(r, s) \wedge P(s)]$

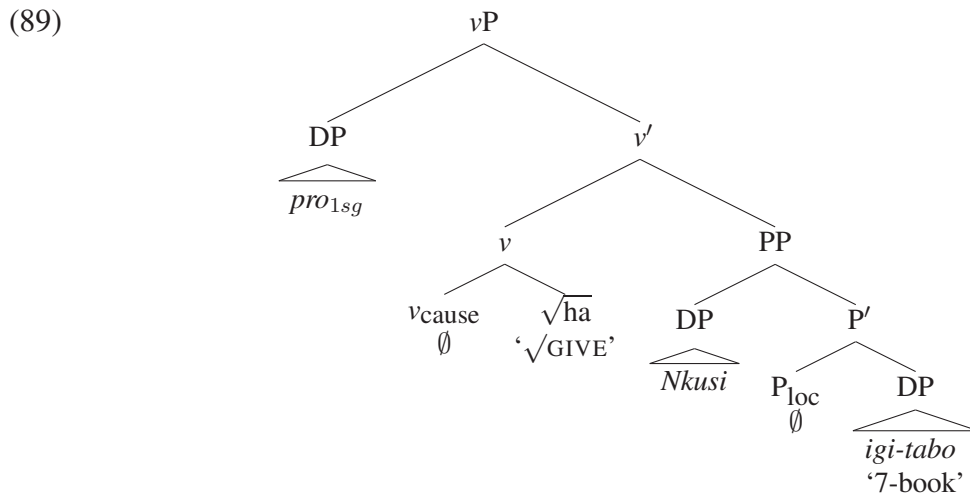
- When you use *-ir* you're adding in a participant that *either* benefits *or* is a recipient:

- (88) *N-a-men-ey-e/-juguny-iy-e/-gabur-iy-e igikombe Nkusi.*
 1SGS-PST-break-APPL-PFV/throw-APPL-PFV/serve-APPL-PFV cup Nkusi
 ‘I broke a cup for Nkusi.’
 ‘I threw/served Nkusi a cup.’ or ‘I threw/served a cup to someone on Nkusi’s behalf.’
- ‘I caused the cup to be in a broken state and Nkusi has the B' role in that event.’
 - ‘I released the cup through some ballistic action and it is now at some place z and Nkusi has the B' role in that event.’
 - ‘I performing a serving event that resulted some person z actually having the cup and Nkusi has the B' role in that event.’

- In (88a) the root-supplied change is non-dyadic, so Nkusi's role cannot be a recipient and thus must be a beneficiary (i.e. B' when R' does not also hold).
- But in the other cases the change is dyadic, so there's an implicit, existentially-bound z , but there's also Nkusi. How do we interpret z and how do we interpret what Nkusi's role is?
 - If Nkusi is interpreted as *distinct* from z , then he will be a beneficiary because he's not part of the already entailed dyadic change.
 - But if Nkusi is conflated with z then he will be interpreted as a recipient (the intersection of R' and B' , assuming a beneficiary non-recipient goal is not possible).
 - * In (88b) nothing changes save naming z , since a is a recipient anyway.
 - * In (88c) z becomes a recipient due to B' (although it is still also a goal).
- In English the two participants of the dyadic state are taken as syntactic arguments and thus named. In Kinyarwanda only one is; the other is left implicit.
- But there's a process — applicativization — of adding in a new participant that has a role that *could* (but need not!) be role of the implicit argument. That opens up conflating it with the implicit argument, generating basically an English ditransitive (but not always!).

13.3 Lexical Ditransitive Base Verbs

- Analyzing lexical ditransitives is more difficult. The most minimal assumption is that such roots require two DPs in an R' relation, and Harley's P_{loc} head is uniquely possible:

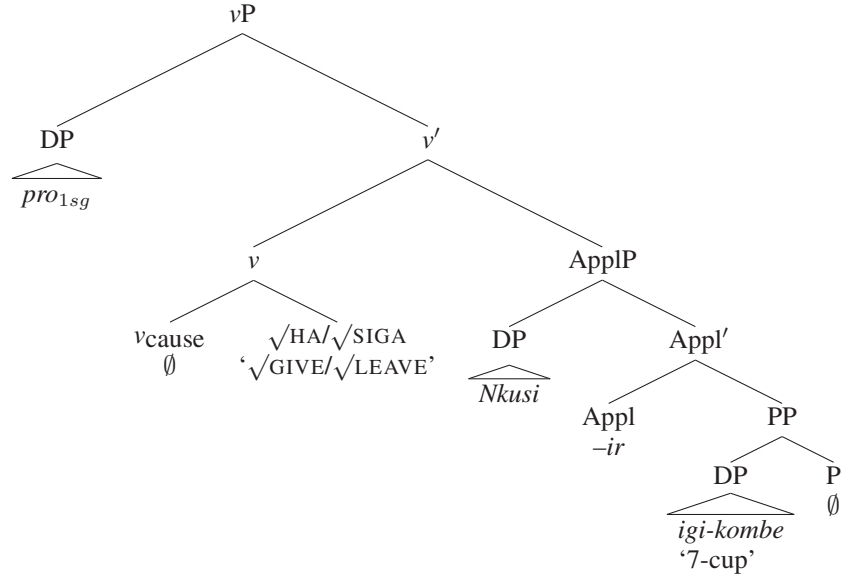


- With \sqrt{HA} z is a non-prospective recipient, but for \sqrt{SIGA} it is a prospective goal:

- (90)
- $[\sqrt{HA}]$ ('give') = "The agent x performed a giving event v that caused an event e which culminated in a state s of the recipient of the state s having the theme."
 - $[\sqrt{SIGA}]$ ('leave') = "The agent x performed a leaving event v that caused an event e which culminated in a state s of the agent losing the theme of state P and thus it ends up at some place z ."

- This will produce verb meanings that are just like English *give* and *leave*.
- Crucially, it should be possible to replace the $P_{loc}P$ by $-ir+$ monotransitive P combination.

(91)

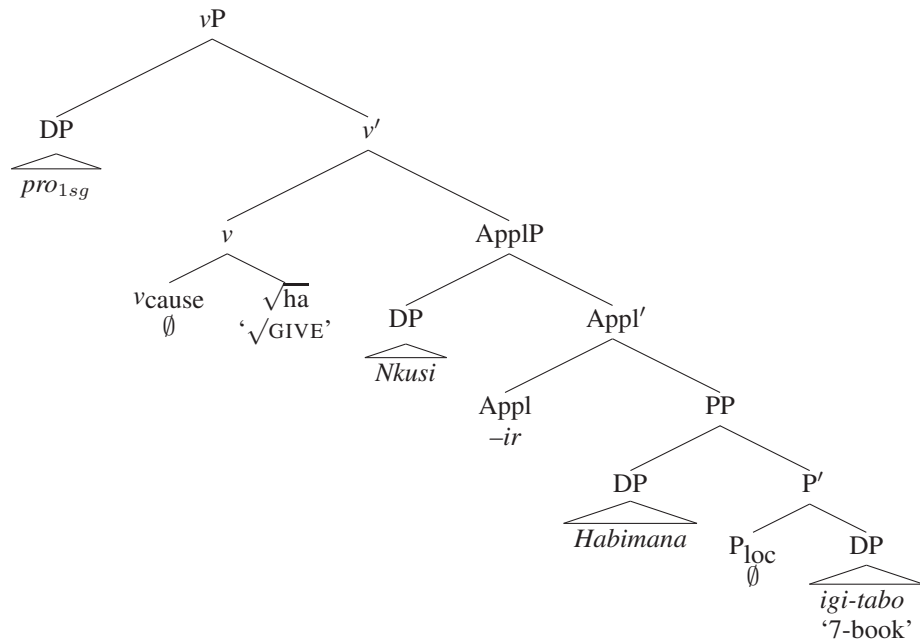


- For $\sqrt{\text{SIGA}}$, it would change z to be B' plus also naming it, making it a recipient. Doing this with $\sqrt{\text{HA}}$ would be non-contentful because the IO is *already* a recipient by virtue of $\sqrt{\text{HA}}$.
- This violates Jerro's (2016b: 57) Applicativization Output Condition (cf. Beavers 2010) that applicativized verbs have stronger readings when non-applicativized (see also Jerro 2018b):

(92) **Applicativization Output Condition (AOC):** In alternations between applied and non-applied forms of a verb, the applied variant has at least one internal argument, and the truth conditions associated with that internal argument are a strict superset of those associated with an internal argument of the non-applied variant.

- We suggest that this blocks the substitution, so *-ir* instead adds an additional argument:

(93)



- There is no option for interpreting the *-ir* AO as anything other than a beneficiary.

14 Returning to Bifurcation

- Thus Kinyarwanda ditransitive roots entail possessional and co-locational meaning (and change) otherwise found in templatic heads, suggesting the incorrectness of Bifurcation (see also Jerro 2017 on Kiyarwanda change-of-state roots that entail change like v_{become}).
- Of course, there *are* alternatives that might preserve Bifurcation.
 - #1 There could be an array of P and *-ir* heads where each is somehow constrained to occur with only a small set of roots or a range of meanings associated with each conditioned on the root (i.e. allosemy; Myler 2014; Wood and Marantz 2015).
 - However, such an approach faces numerous challenges, not least that it predicts a large array of applicatives for which there is little evidence (cp. the applicative classes in Peterson 2007), while there is evidence for the existence of distinct roots.
 - #2 It could be that possession and co-location were never templatic notions to begin with.
 - This is at odds with IOs in English, where possession is entailed. More broadly, that these notions are templatic is well established in prior literature (dating back at least Green 1974: 133-154 for possession and Dowty 1979: 207-219 for location).
 - We furthermore need the templates to preserve structural aspects of the constructions such as asymmetric c-command (assuming that is the explanation for the binding facts).
- An analysis that accepts the relevant meanings as part of the root is more plausible.
- But *why* would this be the case? Bifurcation is a desirable and elegant principle — all meanings of a certain type are bundled into the word building formatives of the grammar.
- While this may be a default pattern of word construction, we suggest that roots that defy it are actually expected to exist owing to their idiosyncratic content: for manner roots like those discussed here the manners they name (e.g. ballistic motion, obligations to give) are only definable in terms of possession and co-locational meanings.
- Thus roots that name those concepts will entail those templatic meanings because those meanings define the concepts. In other cases a root may have Bifurcation-defying meaning as a matter of lexicalization owing to conventional associations.
- Either way, we expect at least some specialization of root meanings to defy Bifurcation even if the core of word building may be based on it.

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